World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:10, No:04, 2016

Energy and Economic Analysis of Heat Recovery from Boiler Exhaust Flue Gas

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Abstract : In this study, the potential of heat recovery from waste flue gas was examined in 60 MW district heating system of a university, and fuel saving was aimed by using the recovered heat in the system as a source again. Various scenarios are intended to make use of waste heat. For this purpose, actual operation data of the system were taken. Besides, the heat recovery units that consist of heat exchangers such as flue gas condensers, economizers or air pre-heaters were designed theoretically for each scenario. Energy analysis of natural gas-fired boiler’s exhaust flue gas in the system, and economic analysis of heat recovery units to predict payback periods were done. According to calculation results, the waste heat loss ratio from boiler flue gas in the system was obtained as average 16%. Thanks to the heat recovery units, thermal efficiency of the system can be increased, and fuel saving can be provided. At the same time, a huge amount of green gas emission can be decreased by installing the heat recovery units.

Keywords : heat recovery from flue gas, energy analysis of flue gas, economical analysis, payback period
Conference Title : ICSREE 2016 : International Conference on Sustainable and Renewable Energy Engineering
Conference Location : Boston, United States
Conference Dates : April 25-26, 2016